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Advances in spine imaging: radiation dose reduction

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Imaging of the spine, as well as surgery, is in continuous evolution. Beside the last ten years imaging hardware and software improvements, an important effort has been made to reduce the radiation dose to the patients, sometimes young patients, that for diagnostic or follow up purposes are studied with plain X-Rays or CT of the spine. It is well known, in fact, that patients with scoliosis, followed-up during their youth, show an higher rate of mammal and endometrium tumours than non scoliotic and thus not exposed, ones. The technological advances are aimed both to reduce the amount of dose given and the sensibility of the revelation systems such as films, flat panels or detectors. ALARA, As Low As Reasonably Achievable is an important principle that remind the operator to keep the radiation dose to the minimum possible but enough to achieve the diagnosis. CT emission can be modulated to reduce the dose to the minimum using automatic softwares, like the Siemens dose-care, or equivalent. In standard X-Ray imaging, the flat panel technology (the so called Direct Radiology DR) reduces more than 4 times the diagnostic dose compared with the dose given by the phosphorus panels (Computed Radiography CR) and to the half the dose of the old analogic imaging with films. The EOS system, produced basically to study the spine and the lower limbs, achieves two important results. In fact EOS allows the spine to be studied in standing position, simultaneously in AP and LL view at a dose of less than 1/10 of the more recent DR systems. These two goals, dose reduction and simultaneous, imaging are achieved thanks to a new detector who's development is based on Prof. Charpak's studies, who won the Nobel prize for this, that allow to keep the radiation at a very low rate. The system utilizes a couple of tube-detectors systems put orthogonally one to the other, so that a contemporaneous AP and LL view can be obtained. It will be then possible to do 3D images and so to get very specific information about the static spino-pelvic parameters that are now considered of the maximum importance when a spine is evaluated, and then to follow the right therapeutic road.

Biography

Alberto Zerbi has completed his graduation in Medicine at the Università degli Studi di Milano in 1982. He is the director of the Departement of Radiology at the IRCCS Istituto Ortopedico Galeazzi in Milan, Italy. He has published more than 100 papers in reputed journals and he is Deputy Editor for Imaging of the European Spine Journal

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